

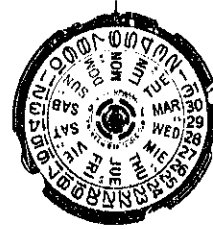
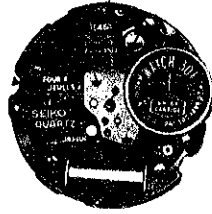
SEIKO





























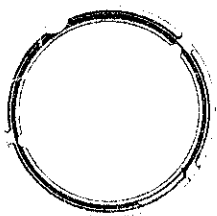










QUARTZ








Cal. 7546A

PARTS LIST

Cal. 7546A



| | | | | | | |
|--|---|--|--|--|--|---|
|  122 750 |  131 750 |  221 750 |  225 611 |  231 750 |  241 750 |  261 611 |
|  271 611 |  282 601 |  354 601 |  383 601 |  384 601 |  387 601 |  388 601 |
|  390 601 |  391 750 |  ☆ 397 601 |  ☆ 397 602 |  701 750 |  ☆ 801 601 |  802 601 |
|  803 601 |  808 601 |  810 601 |  817 611 |  868 601 |  ☆ 870 510 |  873 601 |
|  ☆ 884 750 |  963 610 |  4001 750 |  4002 750 |  4050 751 |  4146 750 |  4239 750 |
|  4242 754 |  4259 750 |  4455 750 |  U.C.C.301 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |
| 022 257 | ☆ 022 421 | 022 468 | 022 491 | 022 494 | 022 760 | 022 761 |

Cal. 7546A

Characteristics :

Casing diameter : ϕ 27.0 mm
 Maximum height : 4.6 mm
 Jewels : 4 j
 Frequency of quartz crystal oscillator : 32,768 Hz (Hz=Hertz Cycles per second)
 Driving system : Step motor system (2 poles)
 Regulation system : Trimmer condenser
 Second setting device
 Calendar (day & date)
 Instant setting device for day & date calendar
 Bilingual change-over system for day of week
 Battery life indicator : Second hand moves in two-second interval

| PART NO. | PART NAME | PART NO. | PART NAME |
|----------|-------------------------------------|-----------|---|
| 122 750 | Center wheel bridge | ☆022 421 | Case screw |
| 131 750 | Third wheel bridge | 022 468 | Third wheel bridge screw |
| 221 750 | Center wheel & pinion | 022 468 | Center wheel bridge screw |
| 225 611 | Cannon pinion | 022 468 | Circuit block screw |
| 231 750 | Third wheel & pinion | 022 468 | Screw for plus terminal of battery connection |
| 241 750 | Fourth wheel & pinion | 022 468 | Date driving wheel screw |
| 261 611 | Minute wheel | 022 491 | Minute wheel bridge screw |
| 271 611 | Hour wheel | 022 494 | Reset lever screw |
| 282 601 | Clutch wheel | 022 760 | Day jumper screw |
| 354 601 | Winding stem | 022 760 | Date dial guard screw |
| 383 601 | Setting lever | 022 761 | Dial screw |
| 384 601 | Yoke (Clutch lever) | 011 405 | Lower hole jewel for fifth wheel |
| 387 601 | Minute wheel bridge | 011 405 | Upper hole jewel for fifth wheel |
| 388 601 | Setting lever spring | 011 537 | Lower hole jewel for step rotor |
| 390 601 | Setting lever axle | 011 537 | Upper hole jewel for step rotor |
| 391 750 | Second setting lever | U.C.C.301 | Silver oxide battery |
| ☆397 601 | Lever for unlocking stem A (Long) | | |
| ☆397 602 | Lever for unlocking stem B (Short) | | |
| 701 750 | Fifth wheel & pinion | | |
| ☆801 601 | | | |
| ☆801 602 | Date dial | | |
| ☆801 604 | | | |
| 802 601 | Date driving wheel | | |
| 803 601 | Setting wheel lever complete | | |
| 808 601 | Date dial guard | | |
| 810 601 | Date jumper | | |
| 817 611 | Intermediate date wheel | | |
| 868 601 | Day finger | | |
| ☆870 510 | | | |
| ☆870 558 | Day star with dial disk | | |
| ☆870 559 | | | |
| ☆870 601 | | | |
| 873 601 | Day jumper | | |
| ☆884 750 | | | |
| ☆884 752 | Holding ring for dial | | |
| ☆884 753 | | | |
| ☆884 755 | | | |
| 963 610 | Snap for day star with dial disk | | |
| 4001 750 | Circuit block | | |
| 4002 750 | Coil block | | |
| 4050 752 | Circuit bridge plate | | |
| 4146 750 | Step rotor | | |
| 4239 750 | Rotor stator | | |
| 4242 754 | Plus terminal of battery connection | | |
| 4259 750 | Anti-magnetic shield plate | | |
| 4455 750 | Reset lever | | |
| 022 257 | Setting lever spring screw | | |

☆⇨Please see remarks on the reverse page.
 Part numbers in light letters are not shown in photos.

Cal. 7546A

Remarks :

Lever for unlocking stem

- ☆397 601.....Used for the one-piece type case the dial whose external diameter is more than **27.5 mm.**
Used for the cases shaped other than round with dial whose external diameter is more than **14 mm.**
- ☆397 602.....Used for the one-piece type case with the dial whose external diameter is less than **27.5 mm.**
Used for the cases shaped other than round with dial whose external diameter is less than **14 mm.**

Date dial

- ☆801 601 (Black figures on white background) } Used for both the crown and calendar
 - ☆801 604 (White figures on black background) } frame at **3 o'clock** position.
 - ☆801 602 (Black figures on white background) } Used for the crown at **4 o'clock** and the calendar
 - frame at **3 o'clock** position.
- If any other type of date dial is required, specify ① Cal. No. ② The crown position ③ The calendar frame position ④ Jewels and ⑤ Dial No.

Day star with dial disk

- ☆870 510 (English ↔ Spanish, black figures on white background) }
 - ☆870 601 (English ↔ Spanish, white figures on black background) }
Used for both the crown and calendar frame at **3 o'clock** position.
 - ☆870 558 (English ↔ Spanish, black figures on white background) }
 - ☆870 559 (English ↔ Spanish, white figures on black background) }
Used for the crown at **4 o'clock** and the calendar frame at **3 o'clock** position.
- If any other type of day star with dial disk is required, specify the number printed on the disk.

Holding ring for dial

- ☆884 750.....Used for the snap-type case with round dial, the crown at **3 o'clock** position.
 - ☆884 753.....Used for the dial is shaped other than round, the crown at **3 o'clock** position.
 - ☆884 755.....Used for the square dial, the crown at **3 o'clock** position.
 - ☆884 752.....Used for "**Sports 100**" with mark on the dial, the crown at **4 o'clock** position, and, for the watch of screw-type case back with round dial, the crown at **3 o'clock** position.
- The type of holding ring for dial is determined based on the design of cases and dials.
If the shape of the holding ring for dial is different from the above, or if the Part No. of the holding ring for dial is unknown, check the case number and refer to "**SEIKO Quartz Casing Parts List**" to choose a corresponding holding ring for dial.

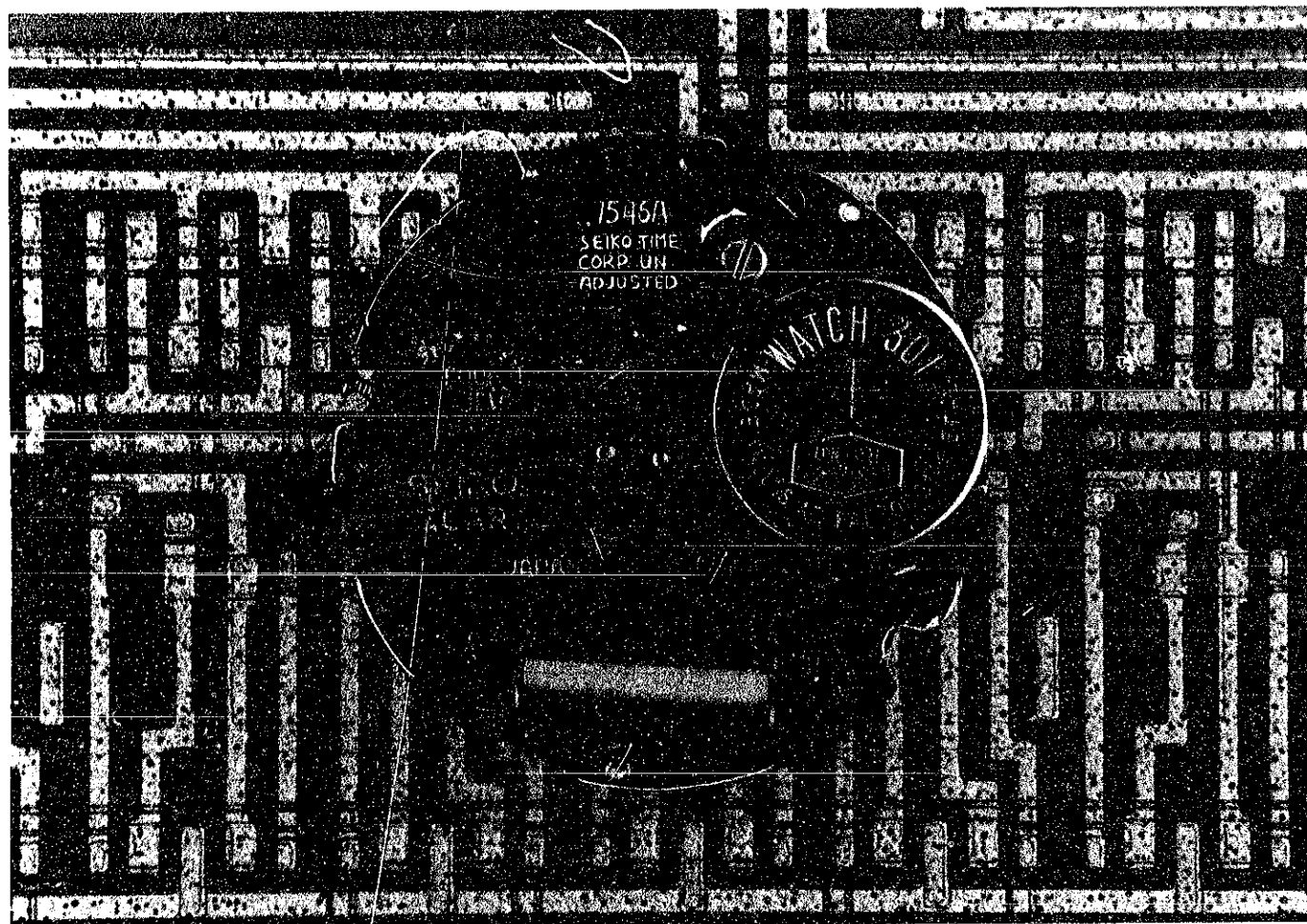
Case screw

- ☆022 421.....Used for this screw according as the case construction.

TECHNICAL GUIDE

SEIKO
QUARTZ

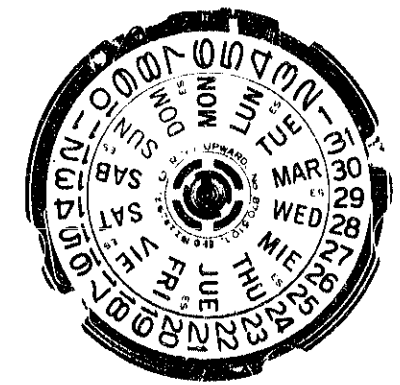
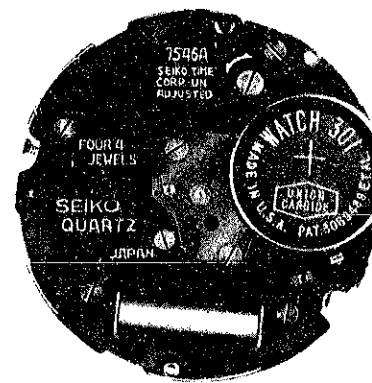
CAL.7546A



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Calibre 7546A



Movement

I. SPECIFICATIONS AND FEATURES

1. Specifications

| | |
|-------------------------------|---|
| Item | Cal. No. 7546A |
| Time indication | Hour, minute & second hands |
| Additional mechanism | Calendar (day & date) Bilingual change-over system for the day of the week Instant day and date setting Electronic circuit reset switch Second setting device (Stops at every second) Battery life indicator |
| Crystal oscillator | 32,768 Hz (Hz = Hertz . . . Cycles per second) |
| Loss/gain | Loss/gain at normal temperature Monthly rate: less than 15 seconds (Annual rate: less than 3 minutes) Temperature compensation device |
| Casing diameter | φ27.0 mm |
| Height | 4.6 mm |
| Operational temperature range | -10°C ~ +60°C (14°F ~ 140°F) |
| Driving system | Step motor system (2 poles) |
| Regulation system | Trimmer condenser |
| Battery power | Silver oxide battery (U.C.C. 301) Battery life is approximately 5 years. Voltage 1.5 V |
| Jewels | 4 jewels |

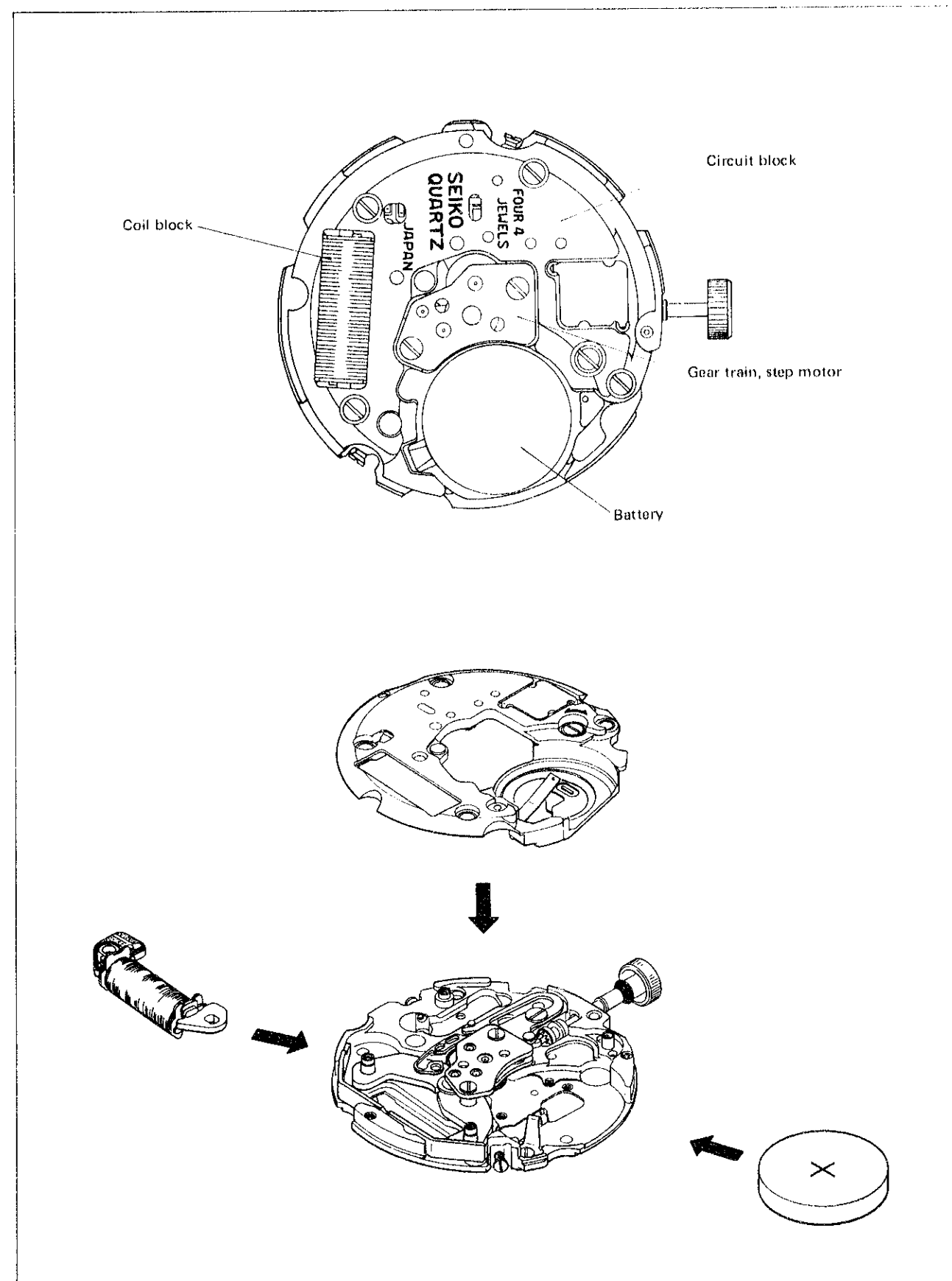
2. Features

- (1) A single battery allows the watch to operate for as long as approximately 5 years with the highest accuracy, thereby eliminating battery replacement procedures.
- (2) Cal. 7546A has combined such function and size as are ideal for daily use.
- (3) As the calendar and the setting mechanisms are composed of the parts interchangeable with those of the Cal. 63 series, it is easy to disassemble and reassemble as well as to provide after-sale services.
- (4) The battery life indicator signals the second hand to move in two second intervals instead of the normal one second interval when the battery life is coming to its end. This indicates the battery must be replaced. The watch will, however, remain accurate while the second hand is moving in two second intervals.

II. FUNCTIONING

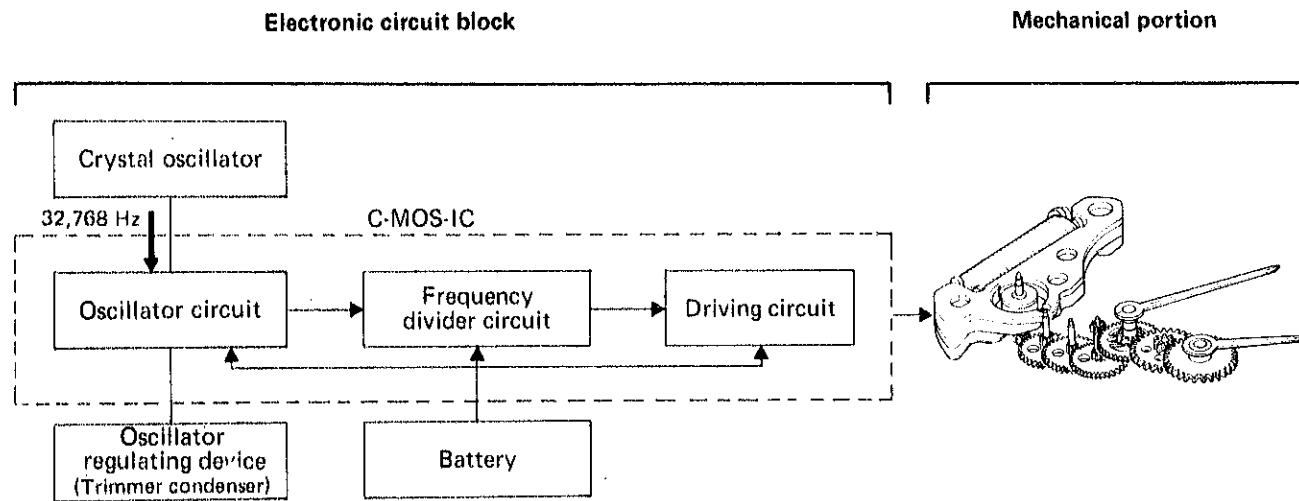
1. Movement structure

The movement consists of the circuit block, coil block, battery and the mechanical portion, of which the main components are a step motor and a gear train. Since each portion is a separate unit, easy checking and adjustment is possible.



2. Outline of functioning

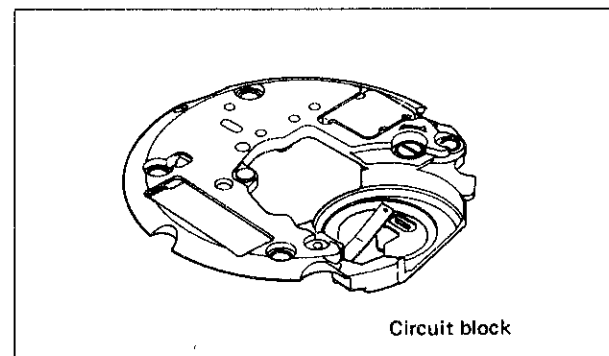
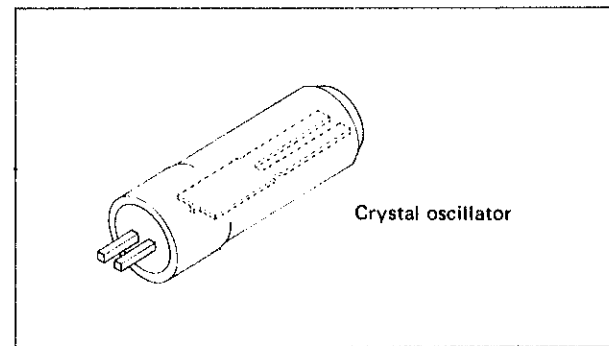
- (1) The quartz crystal oscillator built in the crystal unit, oscillates accurately at 32,768 Hz.
- (2) The circuit unit receives the 32,768 Hz oscillations (electronic signals) and converts them into impulses at the rate of one per second, i.e. $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{2}$. . .
- (3) The one per-second signals are transmitted to the coil block, causing the step motor to rotate in a jumping action once every second in 180° increments.
- (4) This rotation is transmitted to the gear train thus moving the hands.



3. Functioning of electronic circuit block

(1) Circuit block

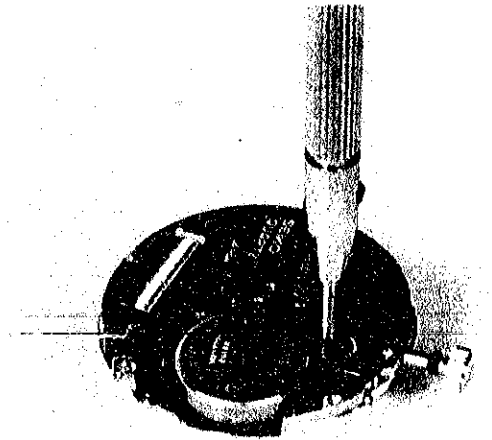
- The quartz crystal oscillator, manufactured by a special technique, is a tuning fork shaped oscillator that is ultrasmall and by far thinner than conventional ones. In order to secure long stability and to be protected against outside influences, the crystal oscillator is housed in a cylinder-type vacuum capsule. When voltage is supplied from the electronic circuit, the crystal oscillator oscillates exactly at 32,768 Hz.
- The C-MOS-IC consists of the oscillator circuit, frequency divider circuit and driving circuit, and is connected electrically with the other electronic parts by the lead terminal. The oscillator circuit supplies voltage to the crystal oscillator to cause it to oscillate at 32,768 Hz and at the same time it takes out the oscillations in the form of an electrical signal. The frequency divider circuit divides the 32,768 Hz electrical signal to finally obtain a signal per second, which is transmitted to the step motor through the driving circuit.



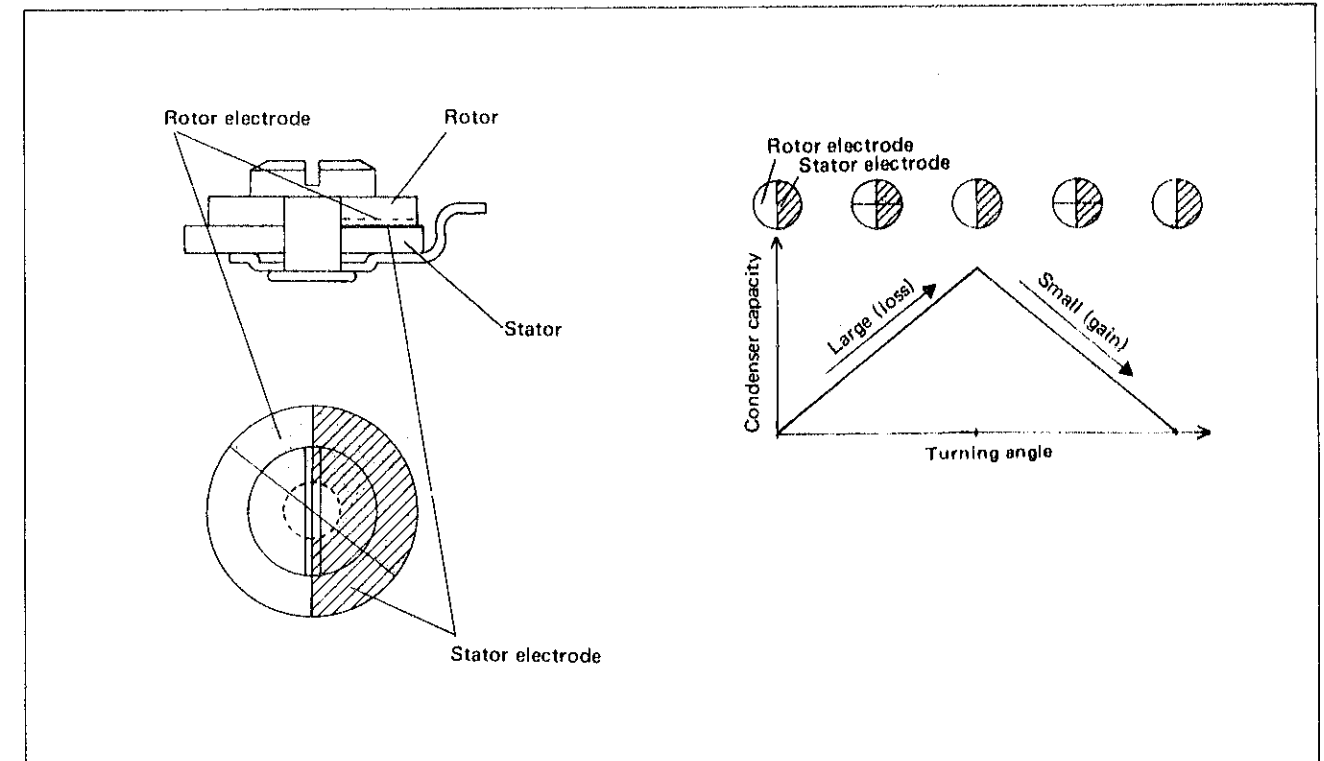
(2) Oscillator regulating device

Adjustment of the oscillator of Cal. 7546A watch can be easily made by simply turning the trimmer condenser.

- Function of the Trimmer Condenser
The trimmer condenser consists of a rotor electrode and a stator electrode. Turning the shaft fixed to the rotor changes the overlapped area between the rotor electrode and stator electrode, which in turn changes the capacitance of the trimmer condenser. Turning the trimmer condenser changes its capacitance as shown in the diagram. Time is adjusted by the magnitude of this change.



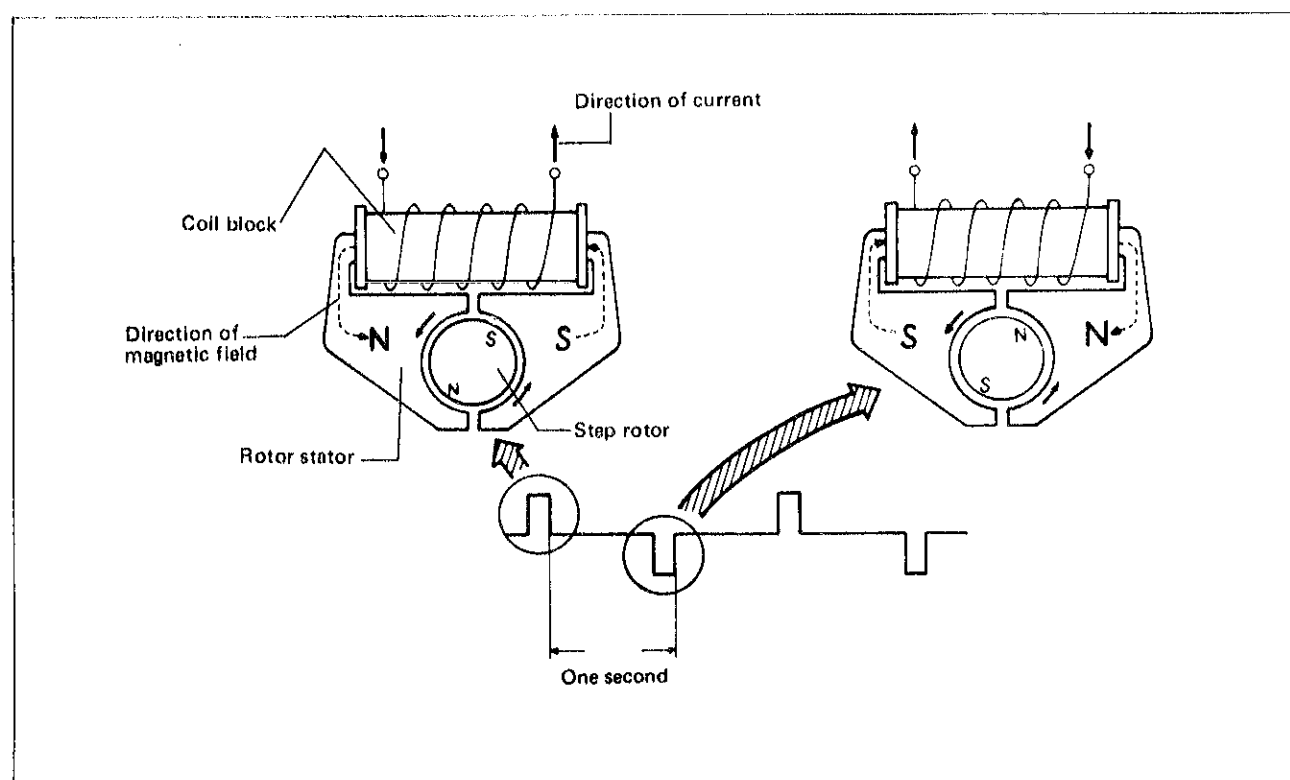
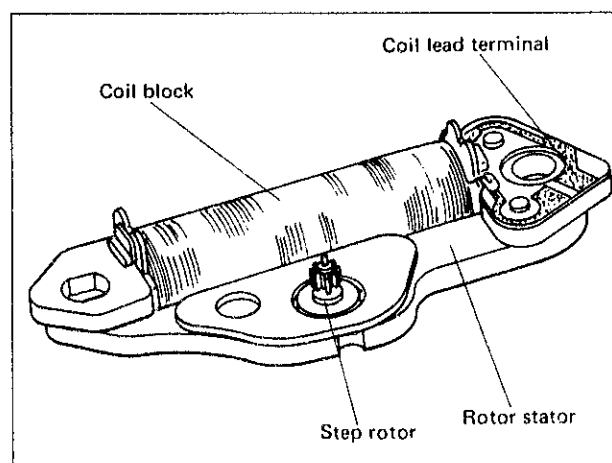
- Checking accuracy cannot be made with conventional mechanical watch timing machines. It is necessary to use the QUARTZ TESTER.



4. Functioning of mechanical portion

(1) Step motor

One of the features of these watches is the SEIKO step motor which changes the vibrations of the crystal oscillator into a rotating motion. The step motor consists of a coil block, a rotor stator and a step rotor. The rotor stator is made of materials having a high conductivity of magnetic force. The step rotor is a circular-shaped permanent magnet having two alternately imposed N and S poles.

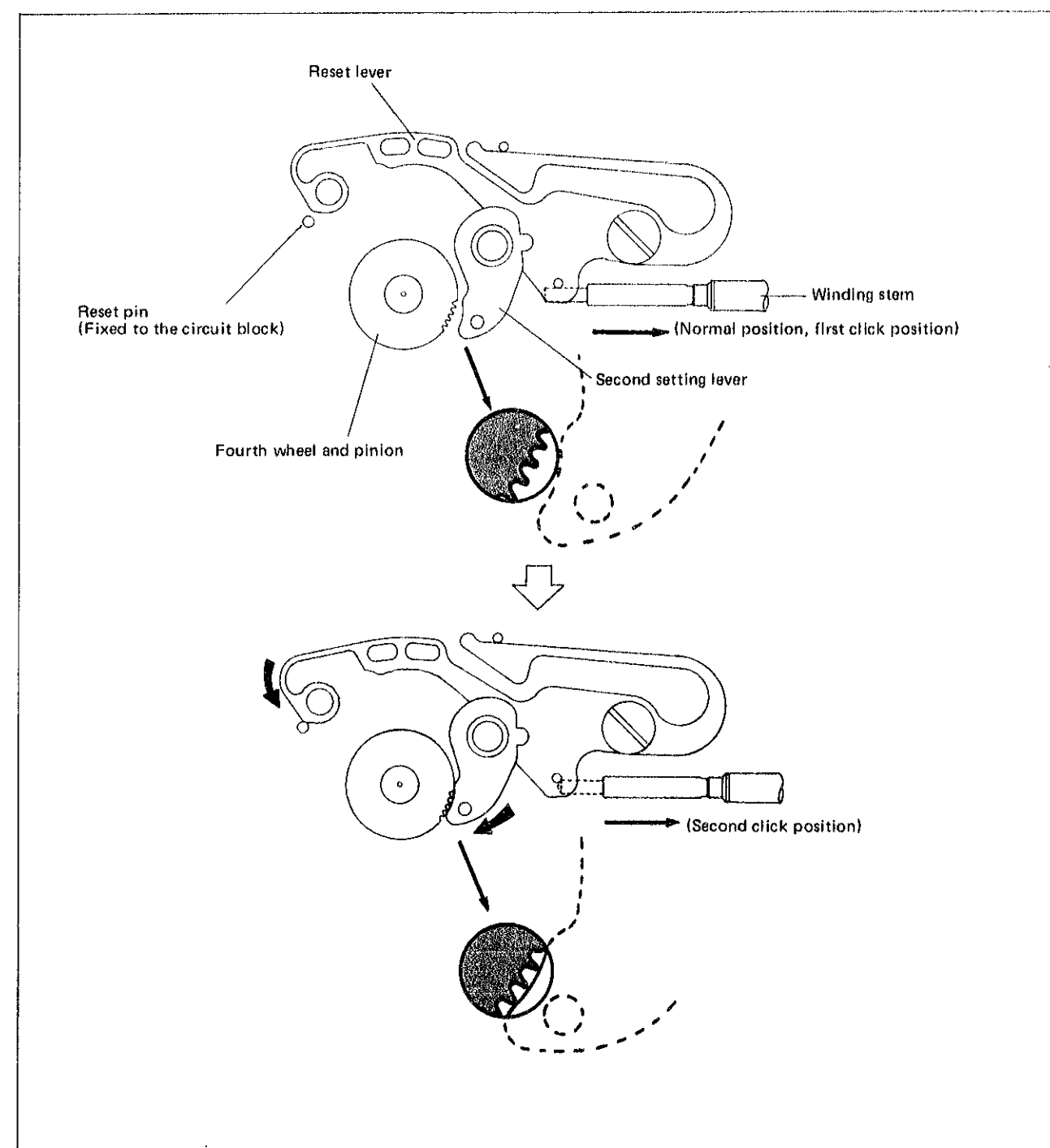


Operational sequence

- 1 **Current flows in the coil block**
The current, of which the flow direction is changed once every second, is transmitted from the circuit block into the coil block.
- 2 **Rotor stators becomes magnets**
When current flows in the coil block, the two rotor stators become magnets and the tip portions become, respectively, N and S poles.
- 3 **Step rotor rotations**
The N and S poles of the rotor stator tips and the N and S poles of the step rotor alternately repel and attract causing the step rotor to rotate in 180° increments in a constant direction once every second.
- 4 **Rotation of the second hand**
Rotation of the step rotor is transmitted to the fifth wheel and pinion which gears with the pinion of the step rotor. The rotation of the fifth wheel and pinion is in turn transmitted to the fourth wheel and pinion which gears with the pinion of the fifth wheel. The rotation of the fourth wheel and pinion is finally transmitted to move the second hand.

(2) Second setting and reset switch

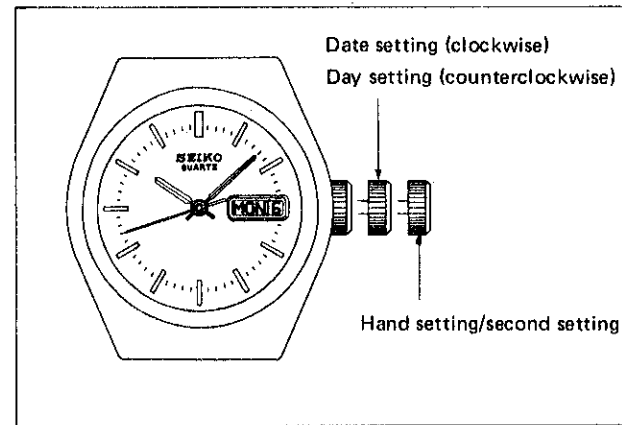
- **Second setting device**
When the crown is pulled out to the second click position, the pin of the reset lever is disconnected from the tip of the winding stem.
Then the reset lever turns in the arrow marked direction and at the same time the second setting lever turns also in the arrow marked direction to touch the fourth wheel and pinion. This stops the gear train from moving and the second hand stop at the desired second position.
- **Reset switch**
When the crown is pulled out to the second click position, the second hand stops and at the same time the reset lever touches the reset pin (fixed to the circuit block) to set the reset switch in the ON position. When the reset switch is in the ON position, the output signal from the circuit block stops. However, the electric current is still flowing from the battery to the crystal oscillator and part of the electronic circuit, and the watch is ready to start.



III. HOW TO SET THE TIME AND CALENDAR

Crown position

- Normal Position . . . Free
- 1st click Date change (clockwise)
Day change (counterclockwise)
- 2nd click Hand setting, second setting
and reset switch

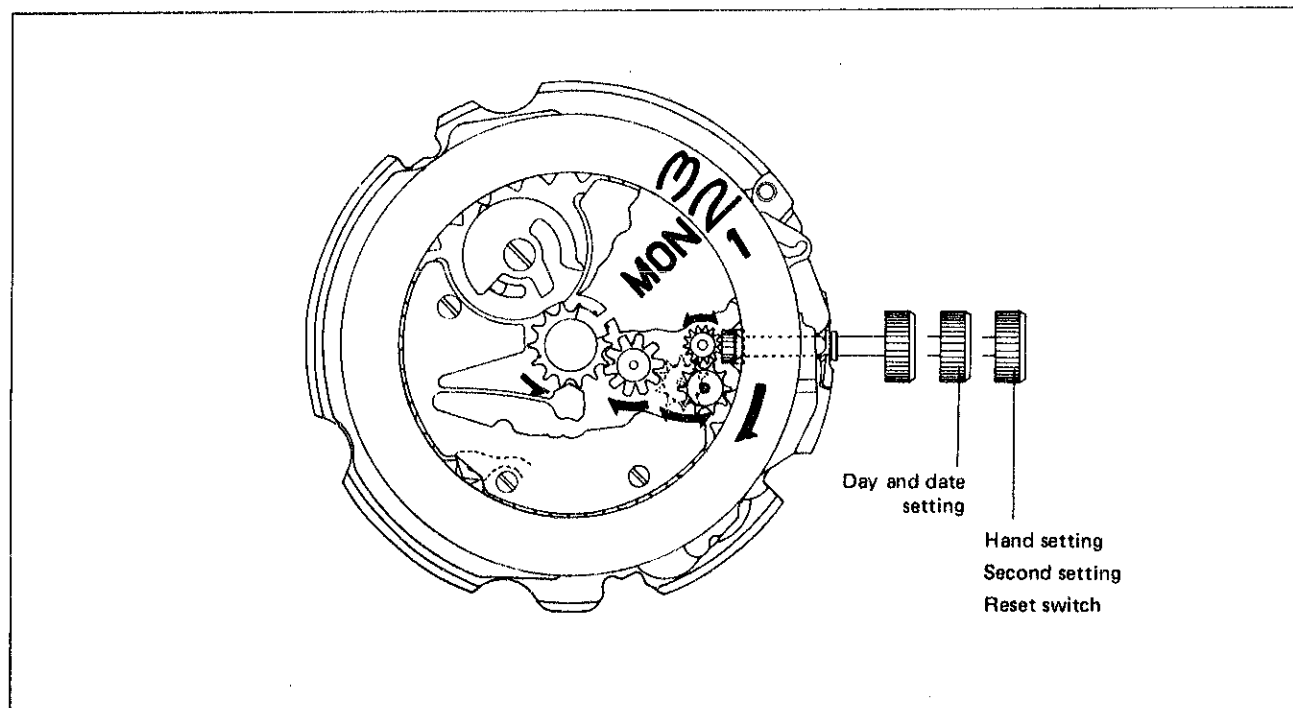


1. To set the time

- 1 Pull out the crown to the second click position. The second hand stops on the every second scale.
- 2 Turn the crown and set the time of the hour hand and minute hand.
 - Be sure to check if it is set in the A.M. or P.M. period. Turn the hour hand past 12 o'clock position to check if it is set in the A.M. or P.M. period. If it is the P.M. period, the date will change.
 - As the torque of the gear train is transmitted reversly, the time is set accurately by turning the hands about 5 or 10 minutes ahead and then turning it back to the desired time.
- 3 Push the crown in accordance with a time signal, and the time is set accurately to the second.

2. To set the calendar

- 1 Pull the crown out to the 1st click.
- 2 Turn the crown clockwise and set the date. Turn the crown counterclockwise and set the day.
 - If the setting of the calendar is made when the hour and minute hands are pointing to the time between 9:30 p.m. and 0:30 a.m., sometimes the calendar will not change the next day. The setting must therefore be made before or after this time period.
 - Select the desired language as two languages appear alternately when setting the day of the week.



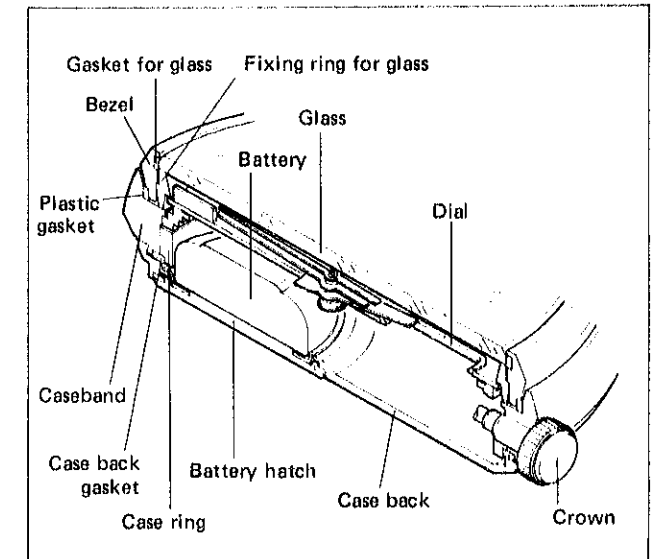
IV. CASE CONSTRUCTION

The case constructions of Cal.7546A are roughly classified into the following two types.

(1) Snap type case back

The glass is fixed to the bezel by the gasket for glass and the fixing ring for glass. The movement is fixed to the caseband with the case ring. The case ring is fixed to the caseband by the case back with the case back gasket.

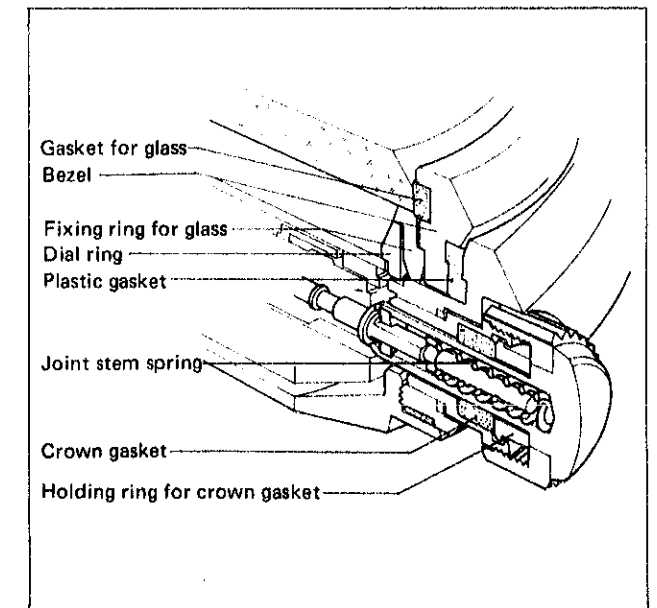
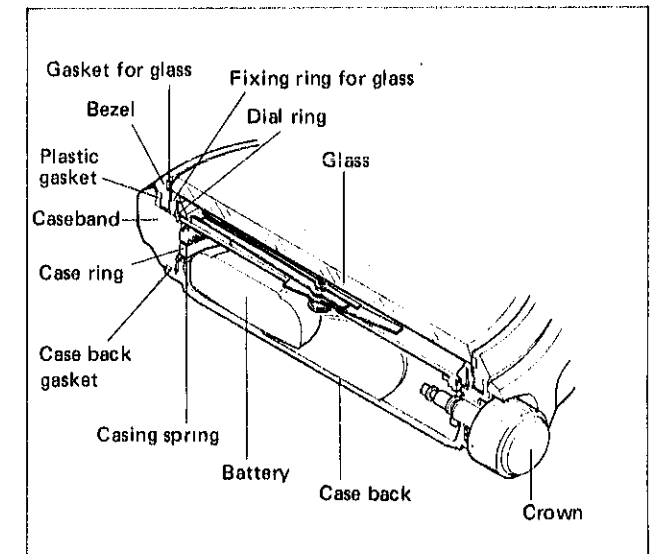
Starting model 7546-6010
6019
8030
8050



(2) Screw type case back

The glass is fixed to the bezel by the gasket for glass and the fixing ring for gasket. The movement is fixed to the caseband with the case ring. The case ring is fixed to the caseband by the case back with the casing spring.

Starting model 7546-6020
6030
8180

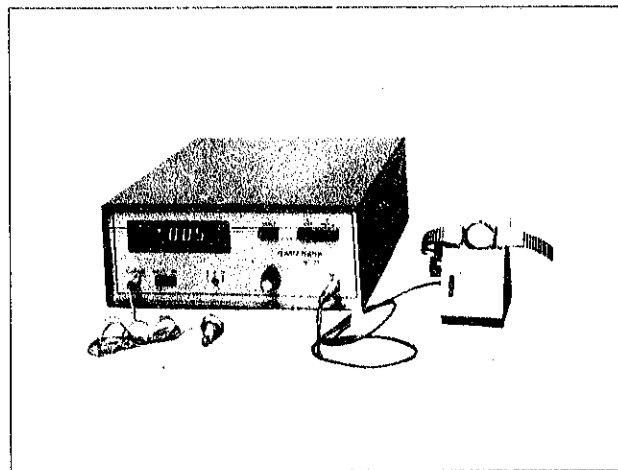


V. AFTER-SALE SERVICING INSTRUMENTS AND MATERIALS

For repair servicing, the following SEIKO after-sale-servicing instruments and materials are necessary.

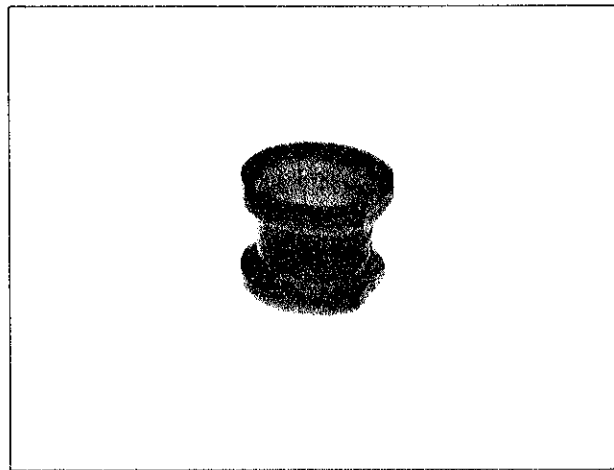
1. Quartz Tester

Used to check time accuracy (daily rates) and the output signal from circuit block.



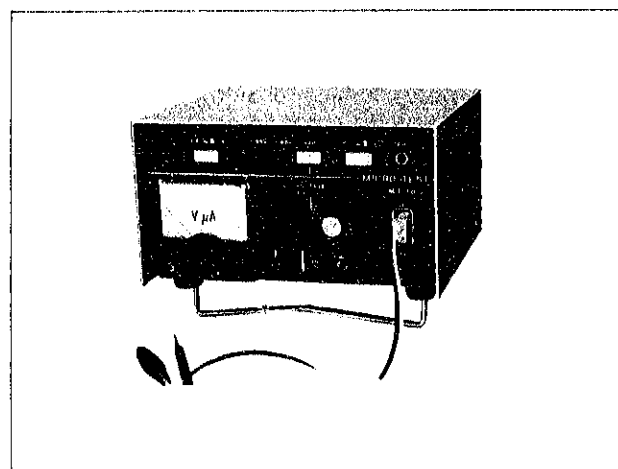
4. Movement holder

Choose one of the movement holders for the 61 series in the movement holder unit S-680.



2. Micro Test MT-10II

Used to check current consumption and supplies a constant flow of voltage power.

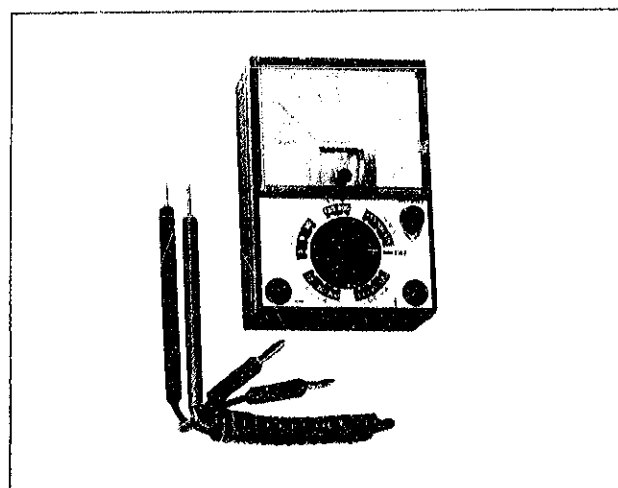


5. Others

- (1) Anti-magnetic tweezers for handling step rotor.
- (2) Non-metallic tweezers for handling battery.

3. Volt-ohm-meter

Used to check battery voltage and its conductivity and to measure current consumption and resistance.



VI. DISASSEMBLING, REASSEMBLING, LUBRICATING AND CLEANING

1. Disassembling, Reassembling and Lubricating

• Disassembling and reassembling

Disassembling procedures Figs.: ① ~ ④⑧

Reassembling procedures Figs.: ④⑧ ~ ①

• Lubricating

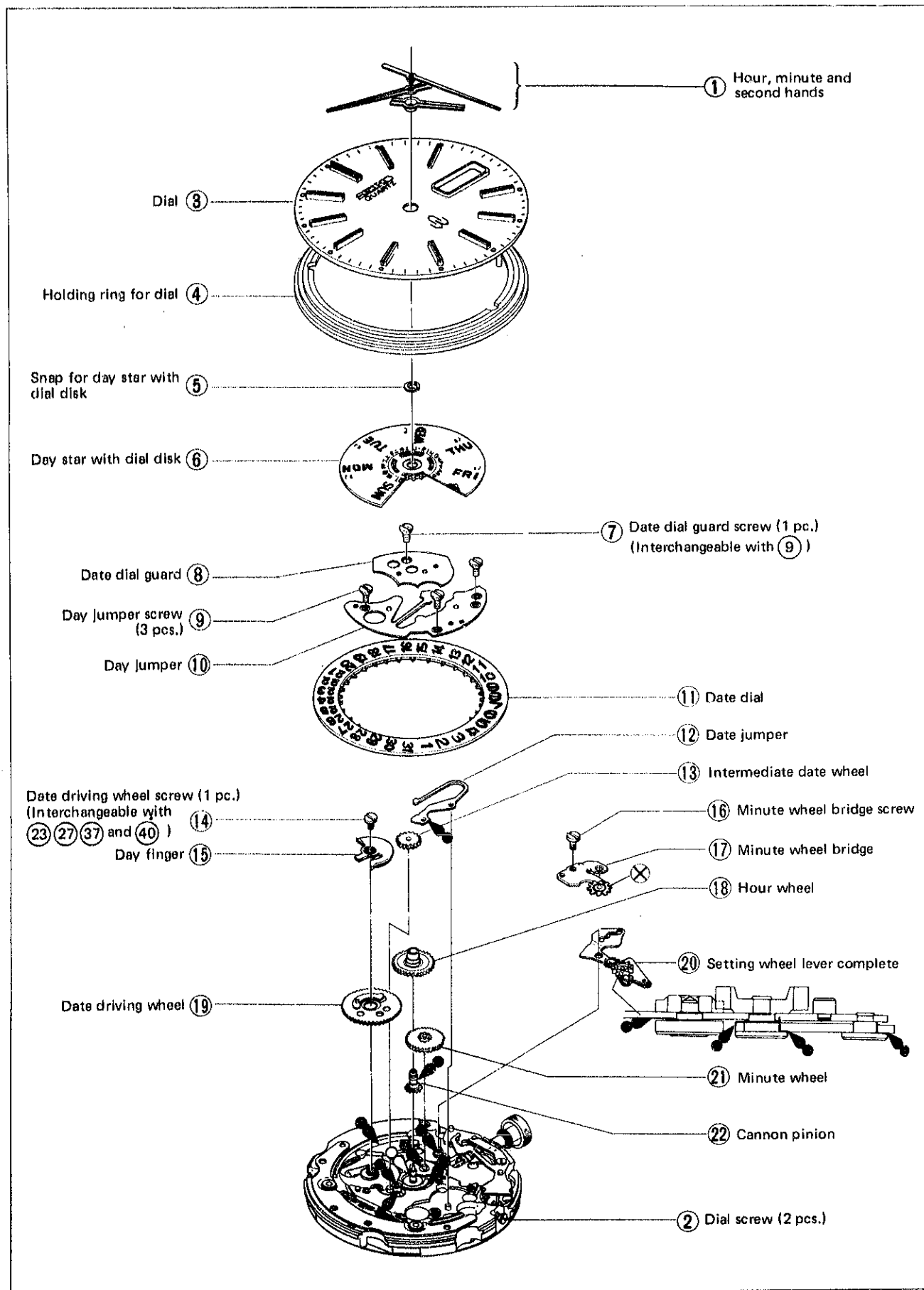
The following marks in the diagrams for disassembling and reassembling indicate the types and quantities of oil to be applied and the lubricating portions. Be sure to lubricate according to the marks.

| Type of oil | Oil quantity |
|-------------|--------------------------|
| ●●● | Moebius A |
| ○●● | Seiko watch oil S-6 |
| ●●● | Liberal quantity |
| ●● | Normal quantity |
| ● | Extremely small quantity |

Never lubricate the portions marked ⊗.

(1) Disassembling, reassembling and lubricating of the calendar mechanism

The parts in the calendar mechanism are interchangeable with those of the Cal. 63 series.

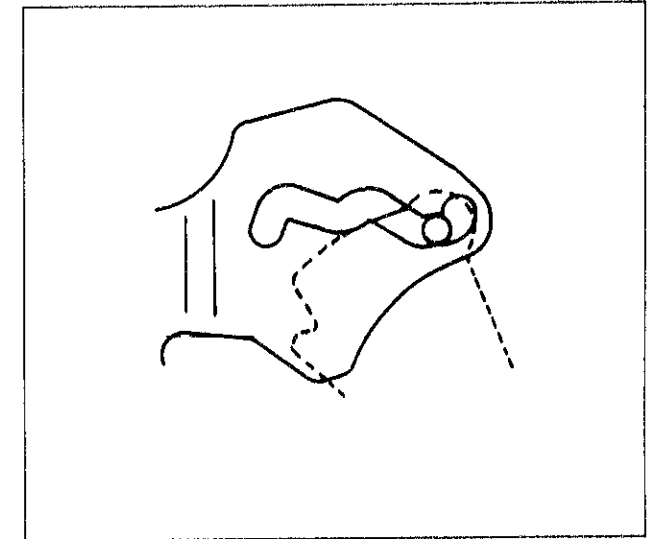


Remarks for disassembling and reassembling

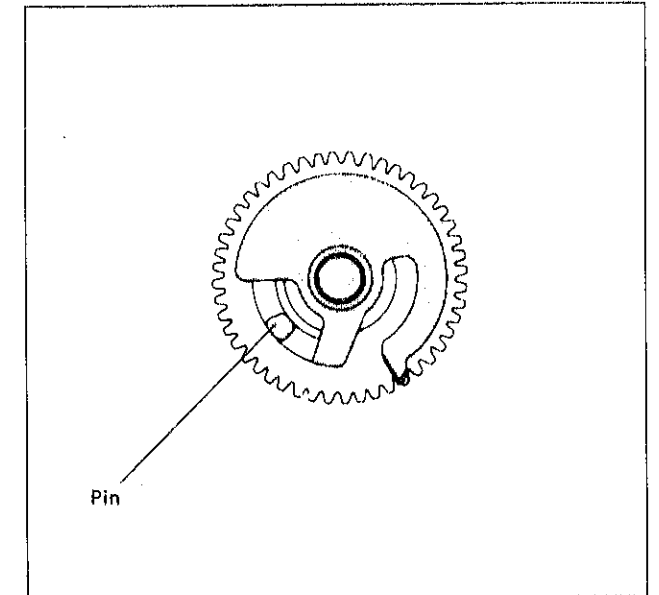
- ① Hour, minute and second hands
 - Pull out the crown to the second click position for disassembling and reassembling.
 - Be sure to assemble the second hand exactly on the second mark (either odd or even second marks will do.)

Remarks for reassembling

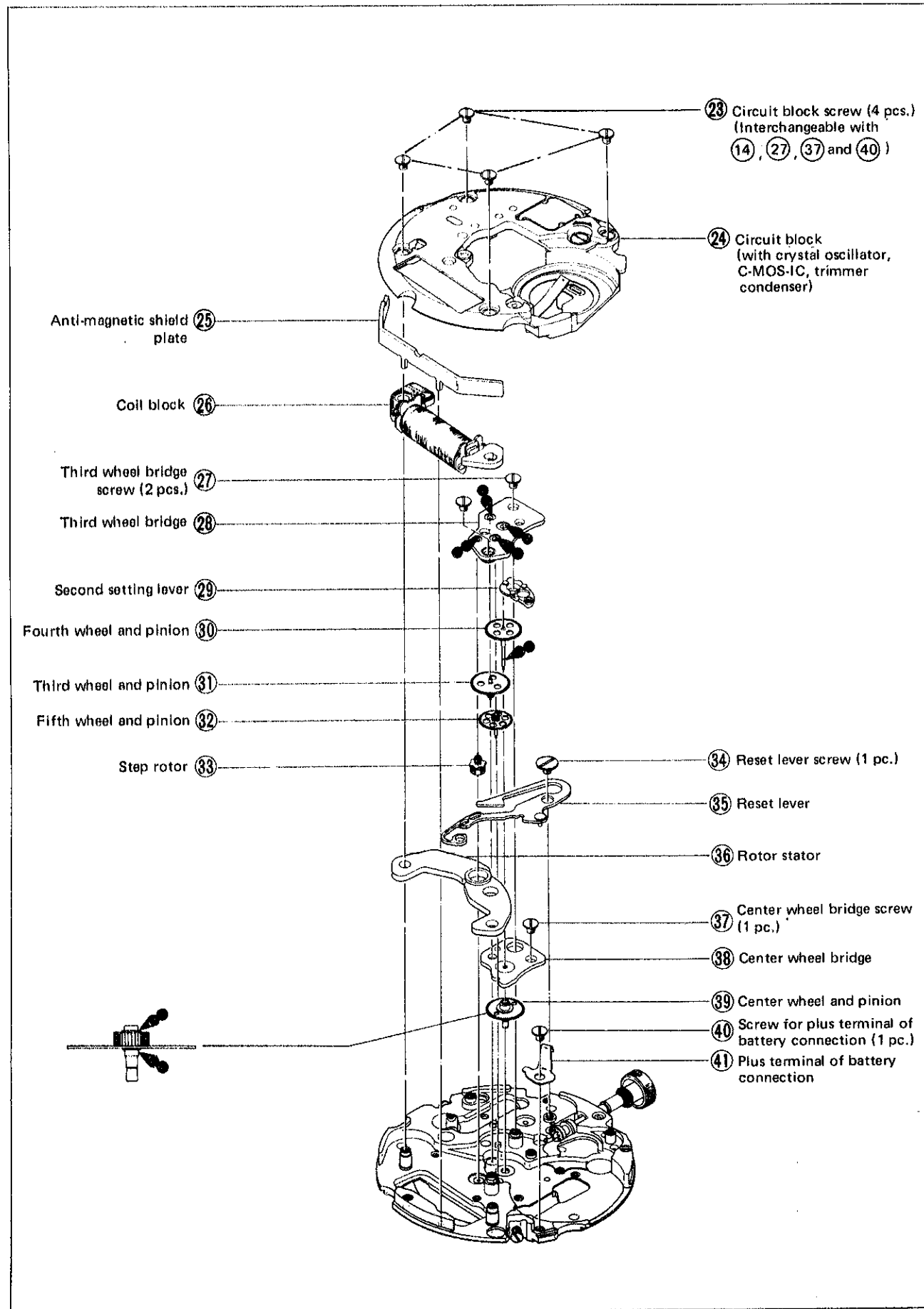
- ②① Setting wheel lever complete
 - Reassemble so that the groove of the setting wheel lever complete holds the setting lever axle.



- ②⑤ Day finger
 - Reassemble so that the pin of the date driving wheel is positioned as shown in the illustration on the right.



(2) Disassembling, reassembling and lubricating of the circuit block, coil block and gear train



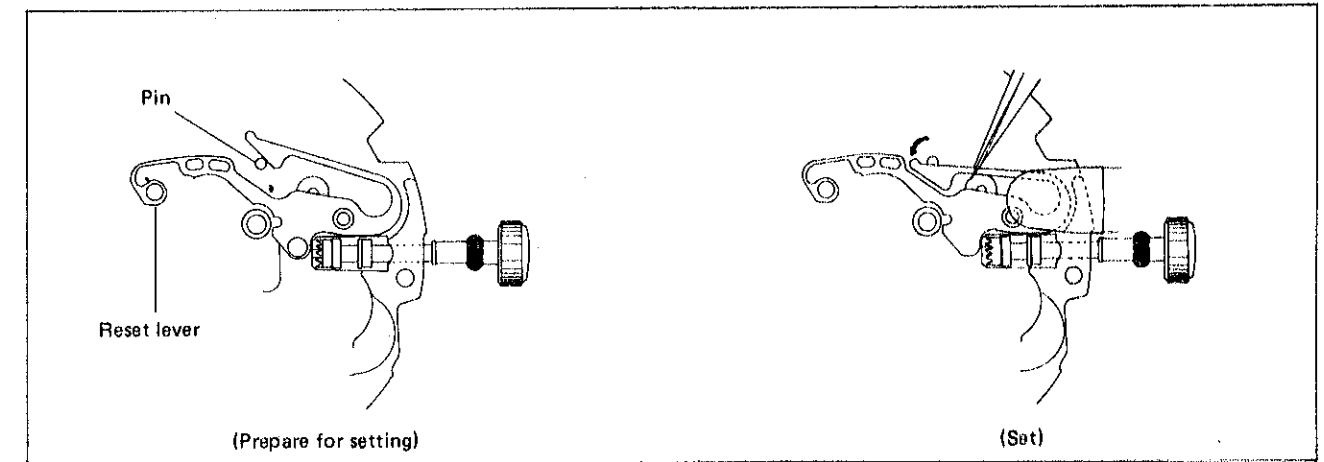
Remarks for disassembling

Disassemble with the crown in the normal position.

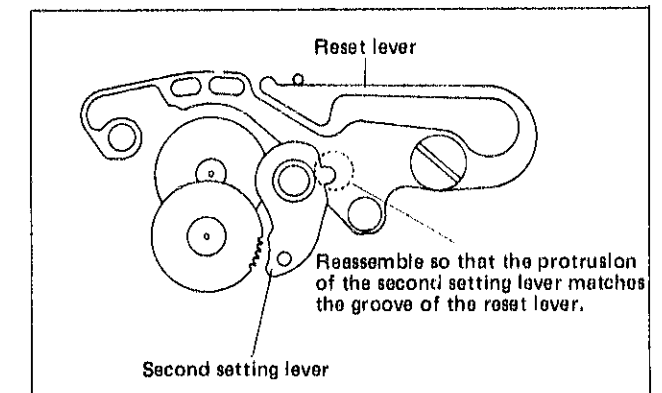
Remarks for reassembling

35 Reset lever
Reassemble with the crown in the second click position.

Depress the crown back into the normal position after the reset lever is set.

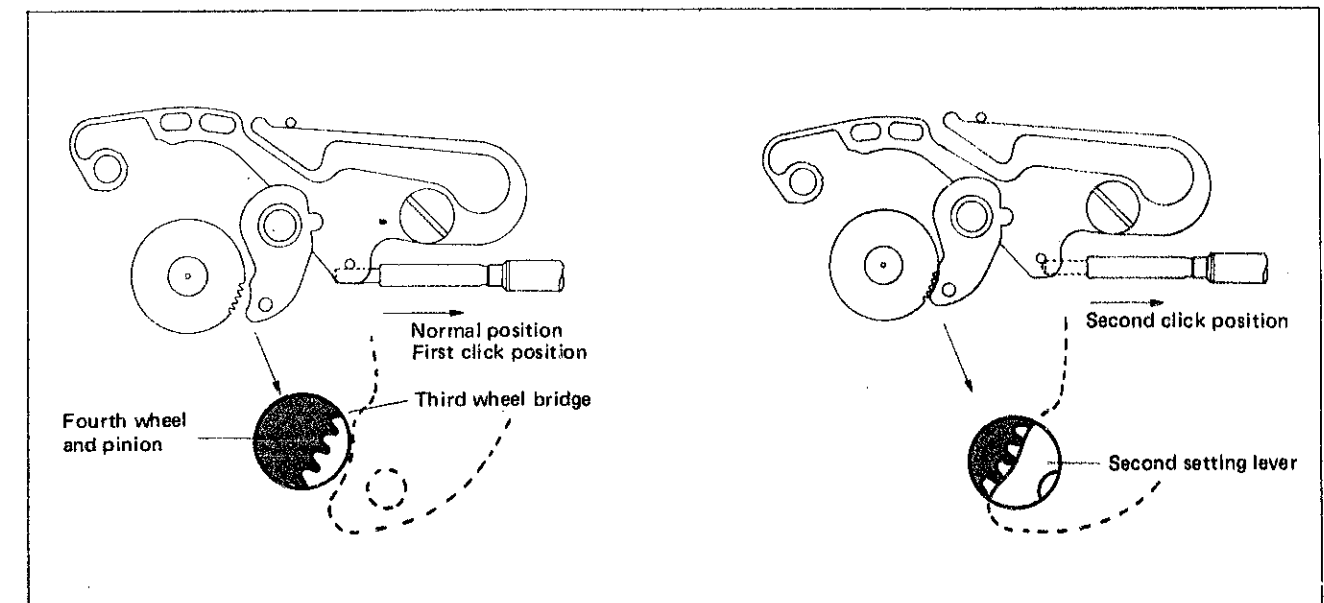


29 Second setting lever



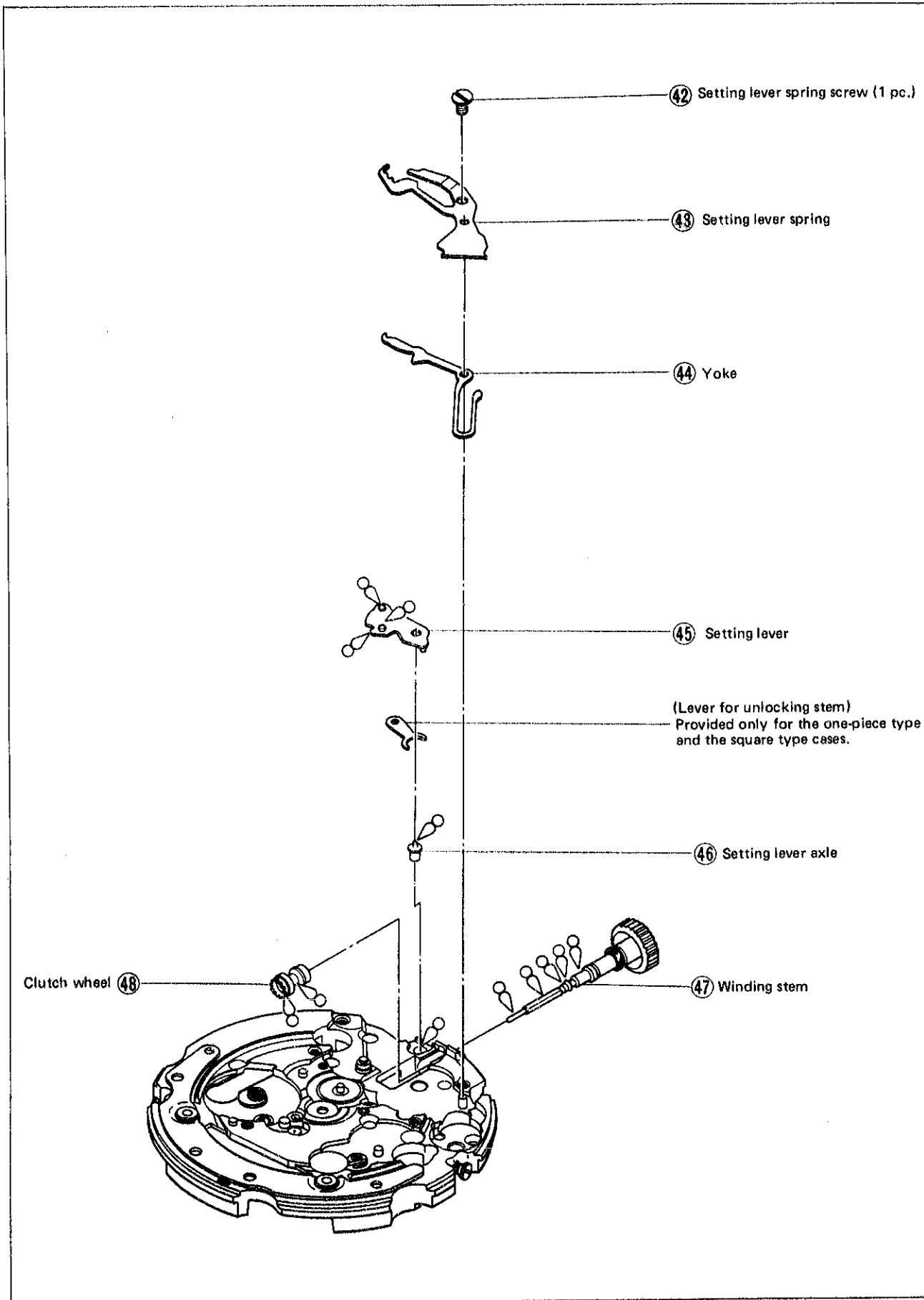
28 Third wheel bridge

After reassembling the third wheel bridge, check to see if the fourth wheel and pinion is set correctly when the crown is in the second click position.



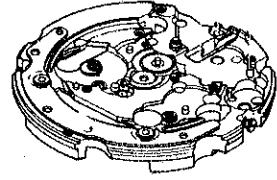

(3) Disassembling, reassembling and lubricating of the setting mechanism

The parts in the setting mechanism are interchangeable with those of the Cal. 63 series.

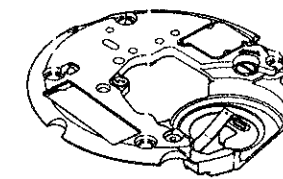


2. Cleaning

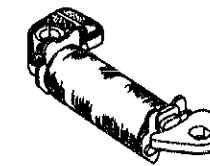
1) HOW TO CLEAN

| Name of parts | Cleaning | Drying | Solution | Remarks |
|--|--|-----------------|-------------------------------------|---|
| Main plate  Step rotor  Plastic parts Date driving wheel Day finger Intermediate date wheel Second setting lever | Rinse or wash with a soft brush | Cool air | Benzine or alcohol | <ul style="list-style-type: none"> Be careful not to remove the parts fixed to the main plate. Be especially careful not to bend the anti-magnetic shield plate. Use a clean solution as the step rotor is magnetized. Any foreign matter which cannot be removed by cleaning should be removed with rodico or adhesive tape. When cleaning with benzine, the cleaning time should be minimized. |
| Others (excluding the parts that must not be cleaned) | Clean with the cleaner, rinse or gently scrub with a soft brush. | Cool or hot air | Benzine, alcohol, trichloroethylene | <ul style="list-style-type: none"> Be careful not to bend the anti-magnetic shield plate. |

2) PARTS THAT MUST NOT BE CLEANED



Circuit block

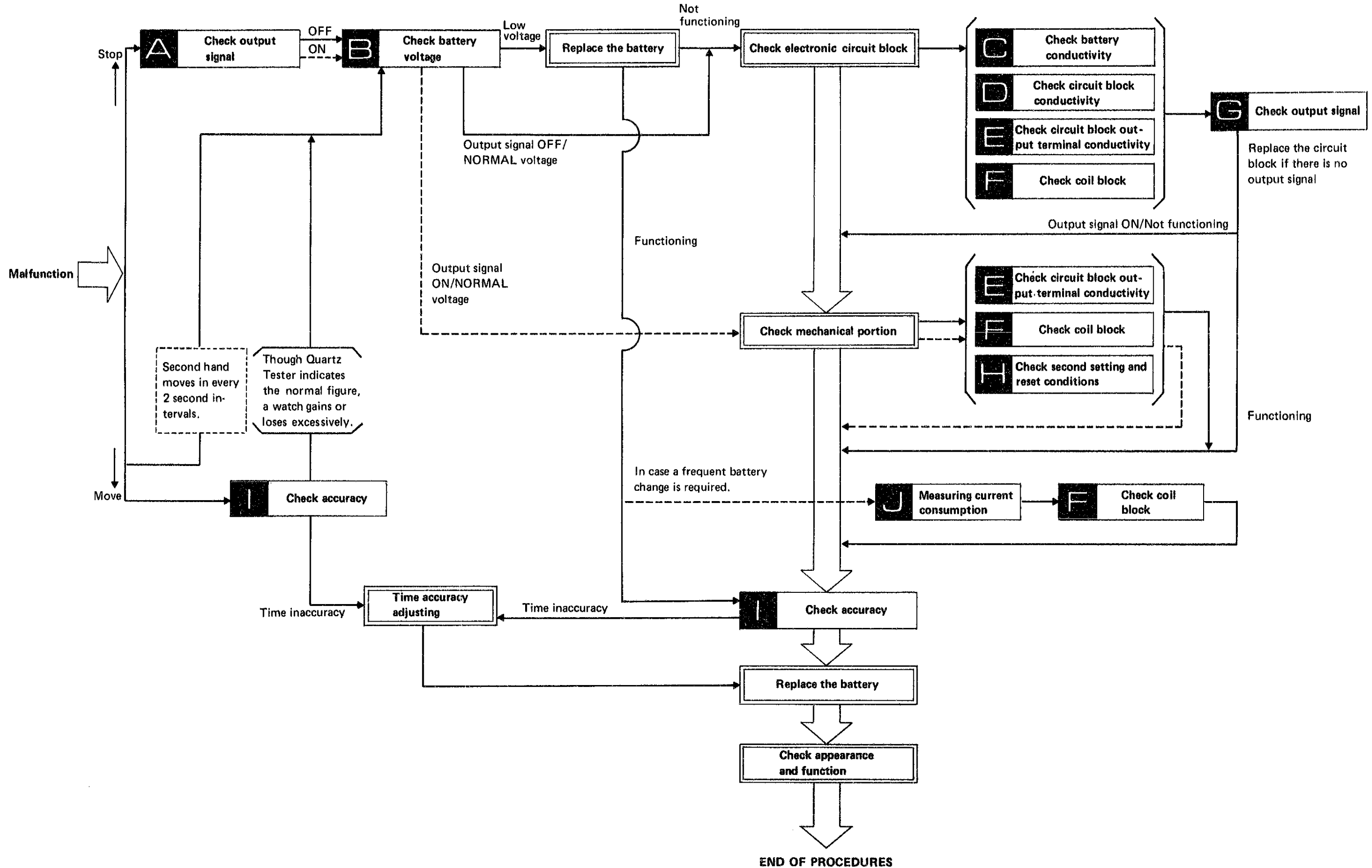


Coil block

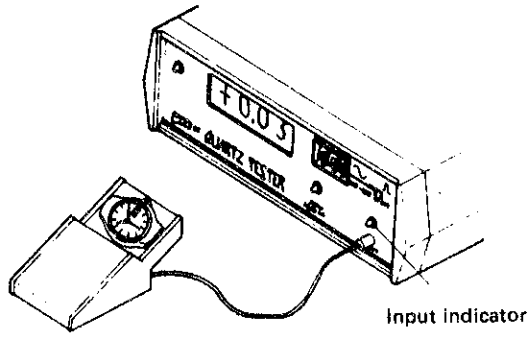
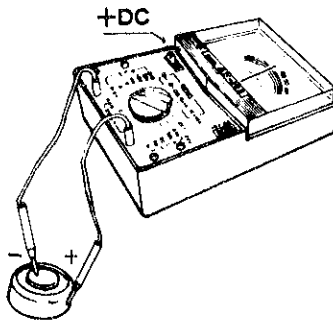
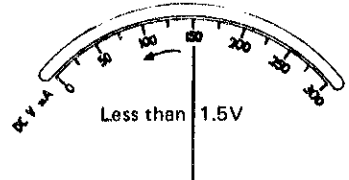
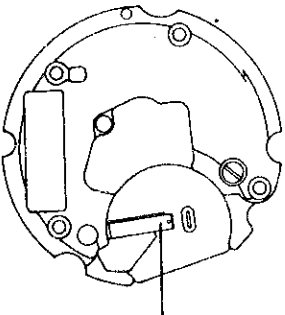
- Be sure to clean only stains on the conductive portions with a cloth moistened with benzine or alcohol and dry them with cool air.

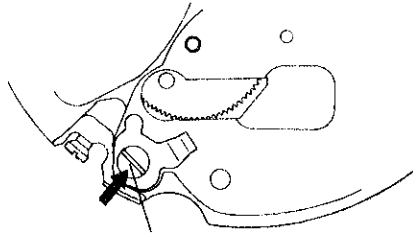
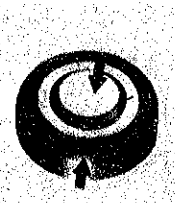

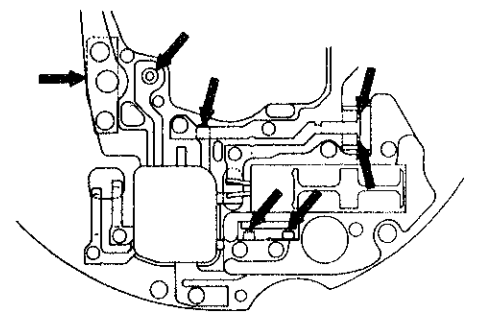
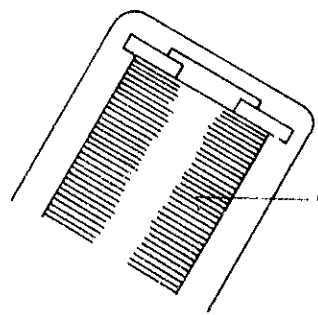
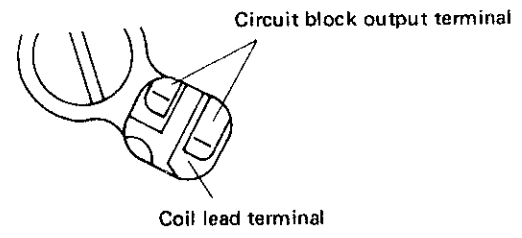
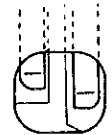


VII. CHECKING AND ADJUSTMENT

1. Guide table for checking and adjustment



2. Procedures for checking and adjustment

| | Procedures | Result | Adjustment and Repair |
|--|---|---|--|
| <p>△</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK OUTPUT SIGNAL</p> | <p>Check output signal.</p> <ol style="list-style-type: none"> 1 Set up the Quartz Tester 2 Checking <p>Check for blinking input indication light.</p>  <p>Note: The checking must be made when the crown is in the normal position.</p> | <p>One-second blinking ----- Normal</p> <p>No one-second blinking ----- Defective</p> | <p>Proceed to B</p> |
| <p>U</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK BATTERY VOLTAGE</p> | <p>Use the following procedures to check battery voltage.</p> <ol style="list-style-type: none"> 1 Set up the volt-ohm-meter Range to be Used: DC 3V 2 Measuring <ul style="list-style-type: none"> • Probe Red (+) Battery surface (+) • Probe Black (-) Battery surface (-)  <p>Note: When handling the battery, use non-metallic tweezers or fingercot.</p> <p>When there is battery electrolyte leakage, refer to "HOW TO CHECK AND REPAIR WHEN THERE IS BATTERY ELECTROLYTE LEAKAGE" below for repairing.</p> | <p>More than 1.5 V ---- Normal</p> <p>Less than 1.5 V -- Defective</p>  | <p>Proceed to Check mechanical portion if one-second blinking is found.</p> <p>Proceed to Check electronic circuit block if one-second blinking is not found.</p> <p>Replace circuit block if the second hand moves in 2 seconds intervals.</p> <p>Proceed to Replace the battery.</p> <ul style="list-style-type: none"> • If the watch functions after battery replacement, proceed to I • If the watch does not function, proceed to Check electronic circuit block. |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">HOW TO CHECK AND REPAIR WHEN THERE IS BATTERY ELECTROLYTE LEAKAGE</p> | <ol style="list-style-type: none"> 1. Remove the movement from the case. 2. Disassemble the movement. 3. Wipe off battery electrolyte on the circuit block. <p>(1) Wipe off battery electrolyte with a cloth moistened with distilled water. (If distilled water is not available, use tap water.)</p> <p>Note: Do not expose the trimmer condenser to water or alcohol. If it is exposed, there may be a change in its condenser capacity and eventually in the time accuracy.</p>  <p>Battery connection</p> <p>Be sure to wipe off battery electrolyte on the battery connection.</p> | <ol style="list-style-type: none"> (2) Wipe them with a cloth moistened with alcohol. (If the cleaned portions remain wet with water, they will corrode with rust.) (3) Dry with cool air by using a dryer. 4. Wipe off battery electrolyte on the other parts by following the procedures on page 16. 5. Reassemble the movement. (Replace the battery with a new one.) 6. Check to see if the time setting functions and the current consumption are normal. | |

| | Procedure | Result | Adjustment and Repair |
|---|---|---|--|
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK BATTERY CONDUCTIVITY</p> | <p>Check to see if the battery current flow to the circuit is normal.</p> <ol style="list-style-type: none"> 1 Check to see if the screw for plus terminal of battery connection is tightened firmly when the circuit block is disassembled. 2 Check for any foreign matter on the connecting portions of the battery, the plus terminal of battery connection and the battery connection.  <p style="text-align: center;">Screw for plus terminal of battery connection</p>   | <p>No loosened screw ----- Normal →</p> <p>Loosened screw ----- Defective →</p> <p>Untaminated ----- Normal →</p> <p>Contaminated ----- Defective →</p> | <p>Proceed to C 2.</p> <p>Retighten the screw.</p> <p>Proceed to D.</p> <p>Wipe off any foreign matter.</p> <p>Note: Be careful not to bend the plus terminal of battery connection and the battery connection.</p> |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK CIRCUIT BLOCK CONDUCTIVITY</p> | <p>Check for any short circuit and defective conductivity of the conductive portions of the circuit block. Disassemble the circuit block and check conductivity of the arrow-marked portions by using a microscope.</p>  | <p>No short circuit or defective conductivity ----- Normal →</p> <p>Short circuit and defective conductivity ----- Defective →</p> | <p>Proceed to E.</p> <p>Replace the circuit block with a new one.</p> |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK CIRCUIT BLOCK OUTPUT TERMINAL CONDUCTIVITY</p> | <ol style="list-style-type: none"> 1. Check the contacting portions of the circuit block output terminal and the coil block. 1 Check to see if there is no short circuit of the circuit block output terminal by viewing through the hole of the circuit block.  <p style="text-align: center;">Coil block</p>  <p style="text-align: center;">Circuit block output terminal</p> <p style="text-align: center;">Coil lead terminal</p> | <p>Circuit block output terminal →</p>  <p>Short circuit →</p>  | <p>Proceed to E 1 2.</p> <p>Correct the bend of the circuit block output terminal by using tweezers.</p>  |

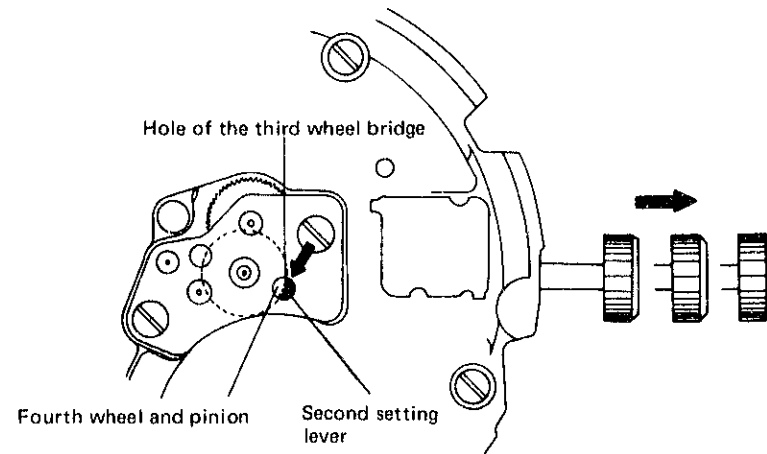
| | Procedure | Result | Adjustment and Repair |
|--|--|---|---|
| CHECK CIRCUIT BLOCK OUTPUT TERMINAL CONDUCTIVITY | <p>2 Disassemble the circuit block and check to see if the circuit block output terminal is positioned as shown in the illustration below.</p> <p>2. Check for any contamination on the circuit block output terminal and the coil lead terminal.</p> | <p>Uncontaminated ----- Normal -----></p> <p>Contaminated ----- Defective -----></p> | <p>2.</p> <p>Correct the bend of the circuit block output terminal by using tweezers.</p> <p>Proceed to F.</p> <p>Wipe off any foreign matter.</p> |
| CHECK COIL BLOCK | <p>Check for broken coil wire and short circuit of the coil block after disassembling the circuit block.</p> <p>1 Set up the Volt-ohm-meter Range to be used: OHMS R x 100</p> <p>2 Checking Apply the probes of the Volt-ohm-meter to the coil lead terminal as shown in the illustration on the right.</p> | <p>Pointer of the Volt-ohm-meter swings -----></p> <p>Broken coil wire (Pointer of the Volt-ohm-meter hardly swings) -----></p> <p>Short circuit (Pointer of the Volt-ohm-meter swings excessively) -----></p> | <p>Proceed to G if the electronic circuit block must be checked.</p> <p>Proceed to H if the mechanical portion must be checked.</p> <p>Replace the coil block with a new one.</p> |
| CHECK OUTPUT SIGNAL | <p>Check for output signal.</p> <p>1 Set up the Quartz Tester</p> <p>2 Checking</p> <p>Follow the same procedures as in A.</p> | <p>One-second blinking -----></p> <p style="margin-left: 100px;">Functioning -----></p> <p style="margin-left: 100px;">Not functioning -----></p> <p>No one-second blinking -----></p> | <p>Proceed to I.</p> <p>Proceed to Check mechanical portion H.</p> <p>Replace the circuit block with a new one.</p> |

I

Procedure

Check the second setting lever condition and reset condition.

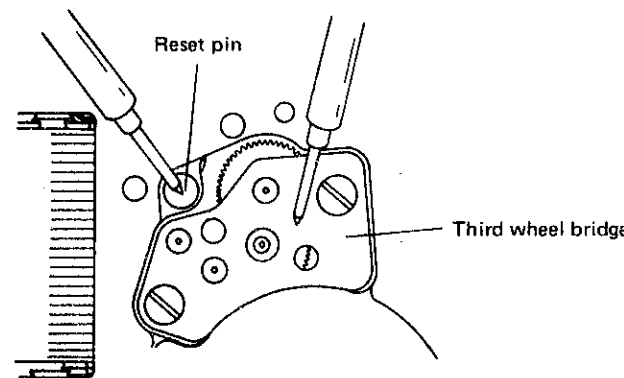
1. Check to see if the second setting lever functions correctly.
 - 1 Check to see if there is clearance between the second setting lever and the fourth wheel and pinion when the crown is in the normal and the first click positions. Also, check to see if the second setting lever touched the fourth wheel and pinion when the crown is in the second click position. (Check through the hole of the third wheel bridge by using a microscope.)



2. Check the reset condition after the circuit block and the battery are reassembled.
 - (1) Check to see if the second hand stops immediately when the crown is pulled out completely and if it starts promptly one second after the crown is pushed in to the normal position.
 - (2) Check to see if the conductivity between the reset pin and the main plate is normal when the crown is pulled out completely.

- 1 Set up the Volt-ohm-meter
Range to be used: OHMS R x 1
Note: Be careful not to use the range other than R x 1. The circuit might be damaged if another range is used.

- 2 Checking
Measure the resistance by applying one of the probes of the Volt-ohm-meter to the third wheel bridge and the other probe to the reset pin.



Result

Function ----- Normal →

Does not function ----- Defective →


Stops completely and starts moving after one second ----- Normal →

Does not stop or moves irregularly ----- Defective →

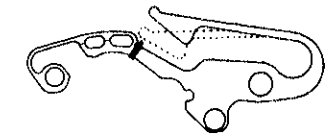
Less than 10 Ω ----- Normal →

More than 10 Ω ----- Defective →


Adjustment and Repair


Proceed to  2.

- Correct the bend of the spring of the reset lever if there is any. (If it is impossible to correct, replace the reset lever with a new one).



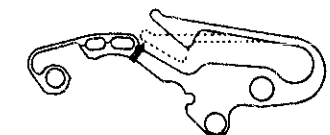
- Replace the second setting lever with a new one if it is damaged.


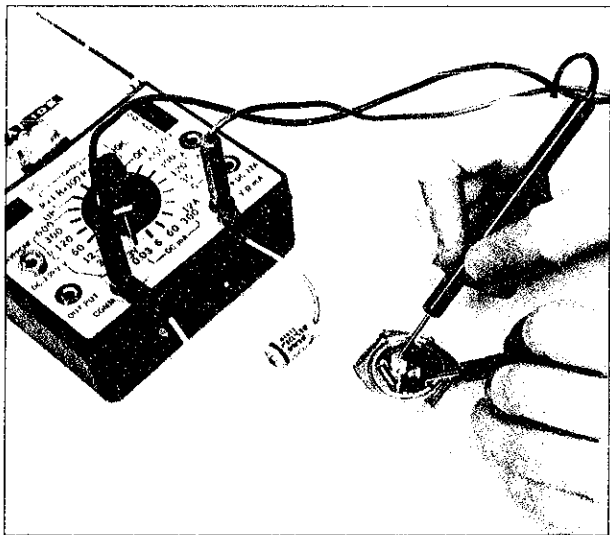


Proceed to  .

Proceed to  2.

Replace the circuit block with a new one.

Correct the bend of the reset lever or replace it with a new one.



| | Procedure | Result | Adjustment and Repair |
|-------------------------------|---|---|--|
| CHECK ACCURACY | <p>Check gain and loss of time.</p> <ol style="list-style-type: none"> 1 Set up the Quartz Tester 2 Checking Check using the same procedure as in  | <p>Normal →</p> <p>Defective →</p> | <p>Follow the procedures shown on page 17.</p> <p>Proceed to Time accuracy adjusting</p> |
| MEASURING CURRENT CONSUMPTION | <p>In case a frequent battery change is required, a current consumption test is recommended. Use the following procedures.</p> <ol style="list-style-type: none"> 1 Set up the Volt-ohm-meter <ul style="list-style-type: none"> • Range to be used: DC 0.03 mA or 12 μA • Set up the condenser of 200 ~ 500 μF as shown in the photo. 2 Measurement <ul style="list-style-type: none"> • Place the battery on the third wheel bridge with its minus side up. Probe Red (+) Battery connection Probe Black (-) Battery surface (-)  <p>Note: Be sure to measure with the crown of the watch in the pushed in position.</p> <ul style="list-style-type: none"> • Be careful that the battery does not touch the reset pin when measuring. | <p>Less than 2.5 μA ----- Normal →</p> <p>More than 2.5 μA ----- Defective →</p> <p>Remarks: There might be a slight difference in the measured value depending upon the type of volt-ohm-meter. When judging the circuit block condition, be sure to take this into consideration.</p> | <p>Proceed to </p> <p>Proceed to </p> <p>When the coil block is found normal, replace the circuit block with a new one.</p> <p>All procedures of Disassembling and Reassembling and Checking and Adjustment are completed.</p> |